Remarks

Applicants add new claims 17-19 herein. Upon entry of this amendment, claims 1-19 will be pending.

Applicants have invented a unique lubricant injector having two distinct seals surrounding a slidably movable pin. The seals include a low-pressure sealing member which is flat and very effective at low pressures (e.g., less than 800 psi). A high-pressure sealing member is cup-shaped and becomes effective at higher pressures (e.g., more than 500 psi) when lubricant forces the sides of the cup outward. In combination, the seals function to effectively seal against leakage of lubricant from the injector body at both high and low pressures. No such lubricant injector is shown or suggested in the prior art.

I. Claims 1-12

Claim 1 recites a lubricant injector having, among other elements, a body containing a reciprocal piston and a pin extending from the piston through an opening in the body. A sealing assembly in the opening surrounds the pin for sealing against leakage of lubricant from the body along the pin. The sealing assembly comprises **a low-pressure sealing member** in sealing contact between the pin and the body effective for sealing at low pressures, and **a high-pressure sealing member** in sealing contact between the pin and the body effective for sealing at pressures higher than said low-pressure sealing member.

U.S. Patent No. 6,142,393 (Kotyk) shows a conventional lubricant metering injector with a cap and gasket which cover an end of the injector. The cap and gasket protect the injector against contamination from external dirt and moisture. Referring to Fig. 3, a reciprocal piston (18) is connected to an indicator pin (32) which

extends from the injector body (14). A conventional washer (38) and packing (40) surround the pin. The packing (40) is a seal (e.g., a fluoroelastomeric material) which prevents leakage of lubricant from the injector body along the pin. The packing is retained in position by the washer (38), which in turn is positioned against an internal shoulder (42) of the injector body.

Kotyk has only one seal and fails to show every element of claim 1. Applicants respectfully disagree with the statement in the Office action that Kotyk's sealing apparatus includes both a low pressure seal and a high pressure seal. The washer (38) is not a seal. It is a conventional metallic disk which functions as a retainer to prevent the packing from moving upward in the injector body. The washer is held against inner shoulder (42) and provides an engagement surface for retaining the packing (40). The arrangement shown in the patent has been conventional practice in this type of injector for many years. The metallic washer does not provide any sealing capability along the pin, nor is it intended to do so.

U.S. Patent No. 4,664,362 (Hennells) shows a gas-filled spring for cushioning large compression forces, such as in a press. The spring has a piston (14) and a packing structure (36) for providing a seal which contains high-pressure gas. The packing structure includes a pair of axially-spaced guide bushings (37, 42) configured to slidably support the piston rod. The bushings are made of bronze and do not provide sealing capability. They do, however, provide graphite lubrication through openings (48). A cup-shaped, elastomeric seal (51) is positioned between the bushings and is effective for sealing air at internal pressures up to 3,000 psi. A lip seal (58) at an end of the spring is provided for preventing contaminants on the piston rod from entering into the gas spring unit (see column 5, lines 20-23). As shown in Figs. 1 and 2, the lip seal (58) has a slanted, polygonal profile which is configured for scraping contaminants from the surface of the piston rod as it moves inward.

Applicants respectfully assert that the cited references do not make obvious the invention of claim 1. First, there is no motivation to combine features of Kotyk and Hennells to improve sealing effectiveness in a lubricant injector. Kotyk shows a conventional injector which is proven effective for its pressure range. Kotyk does not address or contemplate the problems which are solved by Applicants' invention. Rather, Kotyk is directed to preventing external contaminants from entering the injector body. There is no suggestion of the desirability of modifying the injector to improve sealing or prevent leakage of lubricant exiting from the injector body. Obviousness can only be established by modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references or in the knowledge generally available to one of ordinary skill in the art. MPEP 2143.01 citing In re Kotzab, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). Even if the Kotyk reference did provide motivation for improved sealing in a lubricant injector, an artisan would not look to Hennells which has a different purpose. The second seal of Hennell's gas spring (i.e., lip seal (58)) is configured for scraping contaminants, a function unneeded because Kotyk's cap and gasket protect against entry of contaminants.

Moreover, it is impossible to modify Kotyk's injector by replacing the washer with a flexible seal because the rigidity of the washer is necessary for holding the packing in position. During operation of the injector, high lubricant pressures could cause a flexible seal to deflect and permit the packing to move upward out from its intended position in the injector body. That would ruin the injector. Thus, the art teaches away from modifying Kotyk's injector to have a second seal replacing the rigid washer.

Finally, even if the references are combined, they do not show the claimed invention. Specifically, the references do not show a lubricant injector with both

a low-pressure sealing member and a high-pressure sealing member. As discussed above, Kotyk shows a single seal. Although Hennells shows two seals, there is no suggestion that, when installed in a lubricant injector, one would be effective for sealing at low pressures and the other would be effective for sealing at high pressures. Instead, the lip seal (58) of Hennells is configured for scraping contaminants from the piston rod. To the extent the Office takes a position that this feature is inherent, Applicants respectfully but strongly disagree. The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish inherency. See MPEP 2112 IV, citing In re Rijckaert, 9 F.3d 1531, 1534 (Fed. Cir. 1993).

Because there is no motivation to combine the cited references, and because they fail to show or suggest every element of claim 1, Applicants respectfully request that the rejection of claim 1 be withdrawn.

Claims 2-12, depending directly or indirectly from claim 1, are submitted as patentable for the same reasons as claim 1. Moreover, some of these claims recite additional features which are not shown in the prior art of record, including particularly U.S. Patent No. 3,782,736 (Valente). For example, claim 3 specifies that the low-pressure sealing member is generally flat. Claim 6 recites that the low-pressure sealing member and the high-pressure sealing member are disposed in face-to-face contact. That permits the sealing assembly to be held in a single, compact chamber within the injector body, minimizing volume and simplifying the manufacturing process. Claim 8 specifies that the high-pressure sealing member is positioned below the low-pressure sealing member. Thus, for these additional reasons, Applicants request that the rejections of these claims be withdrawn.

II. Claims 13-16

Claim 13 recites a method of sealing a lubricant injector having a body with a reciprocal piston and a pin extending from the piston through an opening in the body. The method includes, among other steps, installing a low-pressure annular sealing member in position surrounding the pin in the opening such that an inner edge is in sliding sealing contact with the pin and an outer edge is in sealing contact with a surface of the body. The low-pressure sealing member is effective for sealing at low pressures. A high-pressure annular sealing member is installed in position surrounding the pin in the opening such that an inner surface is in sliding sealing contact with the pin and an outer surface is in sealing contact with said surface of the body. The high-pressure sealing member is effective for sealing at pressures higher than said low-pressure sealing member.

As discussed above, Kotyk and Hennells fail to show or suggest a lubricant injector with a low-pressure sealing member and a high-pressure sealing member. The references also fail to disclose or suggest a method of sealing an injector with steps of installing these sealing members. Because the cited references, alone or in combination, fail to show or suggest every element of claim 13, Applicants respectfully request that the rejection of claim 13 be withdrawn. Claims 14-16, each depending directly from claim 13, are patentable for the same reasons as claim 13.

III. New Claims

New claims 17-19 recite additional features of embodiments of the present invention. Claim 17 requires that the low-pressure sealing member and the high-pressure sealing member are both positioned within a chamber defined by a counterbore. This configuration provides for compact volume and a simplified

manufacturing process. Claims 18 and 19 recite additional aspects of the low-pressure sealing member.

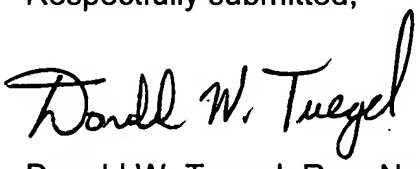
IV. Editorial Change to Specification

Applicants have amended the specification herein to correct an error. The phrase "in sliding sealing contact with" had been inadvertently omitted from paragraph number [0040]. That phrase was included in claim 2 of the application as originally filed, such that no new matter is added.

V. Conclusion

In view of the above, a favorable action and Notice of Allowance are respectfully requested.

Respectfully submitted,



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